



Jeremy Jackson talks about How We Wrecked the Ocean

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We have been hearing a lot about what the oil spill is doing to the ocean. But something else which is also concerning is the condition the ocean was in, even prior to the spill. We live in a finite world. Our continued mistreatment of the ocean, the reduced fish population, and the disappearance of large fish in the last 50 years are all serious concerns.

Jeremy Jackson is the Ritter Professor of Oceanography and Director of the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography. In this talk, Professor Jackson lays out the shocking state of the ocean today: overfished, overheated, polluted, with indicators that things will get much worse. The film is from [TED Talks](#). The movie is 18 minutes long and offers subtitles as an option. I've also copied in the transcript below the fold.

Transcript:

I'm an ecologist, mostly a coral reef ecologist. I started out in Chesapeake Bay and went diving in the winter and became a tropical ecologist over night. And it was really a lot of fun for about 10 years. I mean, somebody pays you to go around and travel and look at some of the most beautiful places on the planet. And that was what I did.

And I ended up in Jamaica, in the West Indies, where the coral reefs were really among the most extraordinary, structurally, that I ever saw in my life. And this picture here, it's really interesting, it shows two things. First of all, it's in black and white because the water was so clear and you

could see so far and film was so slow in the 1960s and the early 70s, you took pictures in black and white. The other thing it shows you is that, although there's this beautiful forest of coral, there are no fish in that picture.

Those reefs at Discovery Bay Jamaica were the most studied coral reefs in the world, for 20 years. We were the best and the brightest. People came to study our reefs from Australia, which is sort of funny because now we go to theirs. And the view of scientists about how coral reefs work, how they ought to be, was based on these reefs without any fish. Then, in 1980, there was a hurricane, Hurricane Allen. I put half the lab up in my house. The wind blew very strong. The waves were 25 to 50 feet high. And the reefs disappeared, and new islands formed. And we thought, "Well, we're real smart. We know that hurricanes have always happened in the past." And we publish a paper in Science, the first time that anybody ever described the destruction on a coral reef by a major hurricane. And we predicted what would happen. And we got it all wrong. And the reason was because of overfishing, and the fact that a last common-grazer, a sea urchin, died. And within a few months after that sea urchin dying, the seaweed started to grow. And that is the same reef. That's the same reef 15 years ago. That's the same reef today. The coral reefs of the north coast of Jamaica have a few percent live coral cover and a lot of seaweed and slime. And that's more or less the story of the coral reefs of the Caribbean, and increasingly, tragically, the coral reefs worldwide.

Now, that's my little, depressing story. All of us in our 60s and 70s have comparable depressing stories. There are tens of thousands of those stories out there. And it's really hard to conjure up much of a sense of well-being, because it just keeps getting worse. And the reason it keeps getting worse is that, after a natural catastrophe, like a hurricane, it used to be that there was some kind of successional sequence of recovery, but what's going on now is that overfishing and pollution and climate change are all interacting in a way that prevents that. And so I'm going to sort of go through and talk about those three kinds of things.

We hear a lot about the collapse of cod. It's difficult to imagine that two, or some historians would say three, world wars were fought during the colonial era for the control of cod. Cod fed most of the people of Western Europe. It fed the slaves brought to the Antilles. The song "Jamaica Farewell" -- "Aki rice salt fish are nice" -- is an emblem of the importance of salt cod from northeastern Canada. It all collapsed in the 80s and the 90s. 35,000 people lost their jobs. And that was the beginning of a kind of serial depletion from bigger and tastier species to smaller and not-so-tasty species, from species that were near to home, to species that were all around the world, and what have you. It's a little hard to understand that, because you can go to a Costco in the United States and buy cheap fish. You ought to read the label to find out where it came from, but it's still cheap, and everybody thinks it's okay.

And it's hard to communicate this. And so, one way that I think is really interesting, is to talk about sport fish, because people like to go out and catch fish. It's one of those things. This picture here shows the trophy fish, the biggest fish caught by people who pay a lot of money to get on a boat, go to a place off of Key West in Florida, drink a lot of beer, throw a lot of hooks and lines into the water, come back with the biggest and the best fish, and the champion trophy fish are put on this board, where people take a picture, and this guy is obviously really excited about that fish. Well, that's what it's like now, but this is what it was like in the 1950s, from the same boat in the same place on the same board on the same dock. And the trophy fish were so big, that you couldn't put any of those small fish up on it. And the average size trophy fish weighed 250 to 300 lbs., goliath groper. And if you wanted to go out and kill something, you could pretty much count on being able to catch one of those fish. And they tasted really good. And people paid less in 1950 dollars to catch that than what people pay now to catch those little, tiny fish. And that's

It's not just the fish though that are disappearing. Industrial fishing uses big stuff, big machinery. We use nets that are 20 miles long. We use long lines that have one million or two million hooks. And we trawl, which means to take something the size of a tractor trailer truck that weighs thousands and thousands of pounds, put it on a big chain, and drag it across the sea floor to stir up the bottom and catch the fish. And think of it as being kind of the bulldozing of a city or of a forest, because it clears it away. And the habitat destruction is unbelievable. This is photograph, a typical photograph of what the continental shelves of the world look like. You can see the rows in the bottom, the way you can see the rows in a field that has just been plowed to plant corn. What that was, was a forest of sponges and coral, which is a critical habitat for the development of fish. What it is now is mud. And the area of the ocean floor that has been transformed from forest to level mud, to parking lot, is equivalent to the entire area of all the forests that have ever been cut down on all of the earth in the history of humanity. And we've managed to do that in the last 100 to 150 years.

We tend to think of oil spills and mercury, and we hear a lot about plastic these days. And all of that stuff is really disgusting, but what's really insidious is the biological pollution that happens because of the magnitude of the shifts that it causes to entire ecosystems. And I'm going to just talk very briefly about two kinds of biological pollution. One is introduced species, and the other is what comes from nutrients. So this is the infamous caulerpa taxifolia, the so-called killer algae. A book was written about it. It's a bit of an embarrassment. It was accidentally released from the aquarium in Monaco. It was bred to be cold tolerant, to have in peoples aquaria. It's very pretty, and it has rapidly started to overgrow the once-very-rich biodiversity of the northwestern Mediterranean. I don't know how many of you remember the movie "The Little Shop of Horrors," but this is the plant of "The Little Shop of Horrors." But, instead of devouring the people in the shop, what it's doing is overgrowing and smothering virtually all of the bottom-dwelling life of the entire northwestern Mediterranean Sea. We don't know anything that eats it. We're trying to do all sorts of genetics and figure out something that could be done, but, as it stands, it's the monster from hell, about which nobody knows what to do.

Now another form of pollution that's biological pollution is what happens from excess nutrients. The green revolution, all of this artificial nitrogen fertilizer, we used too much of it. It's subsidized, which is one of the reasons we used too much of it. It runs down the rivers, and it feeds the plankton, the little microscopic plant cells in the coastal water. But since we ate all the oysters, and we ate all the fish that would eat the plankton, there's nothing to eat the plankton. And there's more and more of it, so it dies of old age, which is unheard of for plankton. And when it dies, it falls to the bottom and then it rots, which means that bacteria break it down. And in the process, they use up all the oxygen. And in using up all the oxygen, they make the environment utterly lethal for anything that can't swim away. And so what we end up with, is a microbial zoo, dominated by bacteria and jellyfish, as you see on the left in front of you. And the only fishery left, and it is a commercial fishery, is the jellyfish fishery you see on the right, where there used to be prawns. Even in Newfoundland, where we used to catch cod, we now have a jellyfish fishery.

And another version of this sort of thing is what is often called red tides or toxic blooms. That picture is just staggering to me. I have talked about it a million times, but it's unbelievable. In the upper right of that picture on the left is almost the Mississippi Delta, and the lower left of that picture is the Texas, Mexico border. You're looking at the entire northwestern Gulf of Mexico. You're looking at one toxic dinoflagellate bloom that can kill fish, made by that beautiful, little creature on the lower right. And in the upper right you see this black sort of cloud moving to shore. That's the same species. And as it comes to shore, and the wind blows, and little droplets of

the water get into the air, the emergency rooms of all the hospitals fill up with people with acute respiratory distress. And that's retirement homes on the west coast of Florida. A friend and I did this thing in Hollywood we called Hollywood ocean night. And I was trying to figure out how to explain to actors what's going. And I said, "So, imagine you're in a movie called 'Escape from Malibu' because all the beautiful people have moved to North Dakota, where it's clean and safe. And the only people who are left there are the people who can't afford to move away from the coast, because the coast, instead of being paradise, is harmful to your health."

And then this is amazing. It was when I was on holiday last early autumn in France. This is from the coast of Brittany, which is being enveloped in this green, algal slime. The reason that it attracted so much attention, besides the fact that it's disgusting, is that sea birds flying over it are asphyxiated by the smell and die, and a farmer died of it, and you can imagine the scandal that happened. And so there's this war between the farmers and the fishermen about it all. And the net result is that the beaches of Brittany have to be bulldozed of this stuff on a regular basis.

And then of course there's climate change, and we all know about climate change. And I guess the iconic figure of it is the melting of the ice in the arctic sea. Think about the thousands and thousands of people who died trying to find the Northwest Passage. Well, the Northwest is already there. I think it's sort of funny, it's on the Siberian coast. Maybe the Russians will charge tolls. The governments of the world are taking this really seriously. The military of the arctic nations is taking it really seriously. For all the denial of climate change by government leaders, the C.I.A. and the navies of Norway and the U.S. and Canada, whatever are busily thinking about how they will secure their territory in this inevitability from their point of view. And, of course, arctic communities are toast.

The other kinds of effects of climate change -- this is coral bleaching. It's a beautiful picture, right. All that white coral. Except it's supposed to be brown. And what happens is that the corals are a symbiosis, and they have these little algal cells that live inside them. And the algae give the corals sugar, and the corals give the algae nutrients and protection. But when it gets too hot, the algae can't make the sugar. The corals say, "You cheated. You didn't pay your rent." They kick them out, and then they die. Not all of them die; some of them survive. Some more are surviving, but it's really bad news. To try and give you a sense of this, imagine you go camping in July somewhere in Europe or in North America, and you wake up the next morning, and you look around you, and you see that 80 percent of the trees, as far as you can see, have dropped their leaves and are standing there naked. And you come home, and you discover that 80 percent of all the trees in North America and in Europe have dropped their leaves. And then you read in the paper a few weeks later, oh, by the way, a quarter of those died. Well, that's what happened in the Indian Ocean during the 1998 El Nino, an area vastly greater than the size of North America and Europe, when 80 percent of all the corals bleached and a quarter of them died.

And then the really scary thing about all of this, the overfishing, the pollution and the climate change, is that each thing doesn't happen in a vacuum, but there are these, what we call, positive feedbacks. The synergies among them that make the whole vastly greater than the sum of the parts. And the great scientific challenge for people like me in thinking about all this, is do we know how to put Humpty Dumpty back together again? I mean, because we, at this point, we can protect it. But what does that mean? We really don't know.

So what are the oceans going to be like in 20 or 50 years? Well, there won't be any fish except for minnows, and the water will be pretty dirty, and all those kinds of things, and full of mercury, etc., etc. And dead-zones will get bigger and bigger, and they'll start to merge. And we can imagine something like the dead-zonification of the global, coastal ocean. Then you sure won't want to eat

fish that were raised in it, because would be a kind of gastronomic Russian roulette. Sometimes you have a toxic bloom; sometimes you don't. That doesn't sell.

The really scary things though are the physical, chemical, oceanographic things that are happening. As the surface of the ocean gets warmer, the water is lighter when it's warmer, it becomes harder and harder to turn the ocean over. We say, it becomes more strongly stratified. The consequence of that is that all those nutrients that fuel the great anchoveta fisheries, of the sardines of California, or in Peru, or whatever, those slow down, and those fisheries collapse. And, at the same time, water from the surface, which is rich in oxygen, doesn't make it down, and the ocean turns into a desert.

So the question is: How are we all going to respond to this? And we can do all sorts of things to fix it, but in the final analysis, the thing we really need to fix is ourselves. It's not about the fish; it's not about the pollution; it's not about the climate change. It's about us, and our greed and our need for growth and our inability to imagine a world which is different from the selfish world we live in today. So the question is: Will we respond to this or not? I would say that the future of life and the dignity of human beings depends on our doing that.

Thank you.



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